AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A neutron detection device, said device comprising:

a sensing mechanism, said sensing mechanism having a layer of boron carbide semiconductor wherein the boron carbide layer is an electrically active part of said detection device; and

a monitoring device, wherein said monitoring device records changes in said boron carbide layer detected by said sensing mechanism.

2. (Original) The device of claim 1, wherein said sensing mechanism is inherent in said boron carbide semiconductor layer and results in a prompt, innately highly amplified, electrical output following capture of a single neutron.

3. (Original) The device of claim 2, wherein said device is a homojunction diode.

4. (Original) The device of claim 1, further comprising a layer of silicon communicating with said layer of boron carbide.

5. (Original) The device of claim 4, wherein said device is a heterojunction diode.

6. (Original) The device of claim 1, wherein the thickness of said boron carbide layer is about 1000 nm.

7. (Original) The device of claim 5, wherein the thickness of said silicon layer is less than 600 nm.

8. (Original) The device of claim 1, further comprising at least two diodes interleaved with a neutron energy absorber.

9. (Original) The device of claim 1, wherein said boron carbide layer is fabricated on a metal substrate.

10. (Original) The device of claim 1, wherein said boron carbide layer contains at least 80% ^{10}B.

11. (Original) The device of claim 1, wherein said device is capable of operating at 500 °C.

12. (Original) A method of detecting neutrons, said method comprising: positioning a neutron detecting device in a location to allow said device to intercept a stream of neutrons, said detector comprising a layer of boron carbide wherein said boron carbide layer is an electrically active part of said device, and a sensing mechanism coupled to said boron carbide layer; introducing at least one neutron traveling in a direction to be intercepted by the boron carbide layer; and monitoring the interaction of the neutron with the boron carbide semiconductor; wherein said sensing mechanism detects changes in said boron carbide layer caused by the interception of neutrons.

13. (Original) A method of detecting neutrons, said method comprising: positioning a neutron detecting device in a location to allow said device to intercept a stream of neutrons, said detector comprising a layer of boron carbide wherein said boron carbide layer is an electrically active part of said device, and a sensing mechanism inherent to said boron carbide layer; introducing at least one neutron traveling in a direction to be intercepted by the boron carbide layer; and monitoring the interaction of the neutron with the boron carbide semiconductor; wherein said sensing mechanism detects changes in said boron carbide layer caused by the interception of neutrons.

14. (Previously Presented) A neutron detecting device comprising:

a semiconducting boron carbide layer; and

a substrate layer coupled with the semiconducting boron carbide layer, wherein the semiconducting boron carbide layer is an electrically active region of the detecting device.

15. (Previously Presented) The neutron detecting device of claim 14, further comprising:

at least two electrodes, wherein one electrode is coupled with the semiconducting boron carbide layer, and wherein the other electrode is coupled with the substrate layer.

16. (Previously Presented) The neutron detecting device of claim 15, further comprising:

a bias voltage source; and

an electrical detection device, wherein the bias voltage source and the electrical detection device are coupled with the two electrodes.

17. (Previously Presented) The neutron detecting device of claim 14, wherein the substrate is formed of silicon.

18. (Previously Presented) The neutron detecting device of claim 14, wherein the substrate is formed of metal.

19. (Previously Presented) The neutron detecting device of claim 14, wherein the semiconducting boron carbide layer is p-type.

20. (Previously Presented) The neutron detecting device of claim 19, wherein the substrate layer is n-type.

21. (Previously Presented) The neutron detecting device of claim 14, wherein the semiconducting boron carbide layer contains at least 80% ^{10}B.

22. (Withdrawn) A neutron detecting device comprising:

a first region formed of p-type semiconducting boron carbide; and

a second region formed of n-type semiconducting boron carbide, wherein the first and second regions are electrically active parts of the detecting device.

23. (Withdrawn) The neutron detecting device of claim 22, further comprising:

at least two electrodes, wherein one electrode is coupled with the first region, and wherein the other electrode is coupled with the second region.

24. (Withdrawn) The neutron detecting device of claim 23, further comprising:

a bias voltage source; and

an electrical detection device, wherein the bias voltage source and the electrical detection device are coupled with the two electrodes.

25. (Withdrawn) The neutron detecting device of claim 22, wherein the first and second regions contain at least 80% ^{10}B.